JUPITER'S SPOTS

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Anyone working a night shift in Northern California this time of year might notice a bright star rising in the East just after sunset, crossing the sky through the night and setting in the West just before the sun rises.

This "star" is in fact only about 500 million miles away. It is the gas giant Jupiter, the fifth planet from the Sun and the largest planet in our Solar System, so large that it has more than double the mass of all the other planets in our Solar System combined, although it is still less than one-thousandth the mass of our Sun.

Named after a Roman god, Jupiter is best known for its Great Red Spot, a reddish area below the equator which has been known to exist for more than 300 years. Many such spots, various shades of red, brown and white, stain the visible exosphere of Jupiter. The spots are in fact cyclonic and anti-cyclonic storm systems raging more than 43,000 miles above the center of the massive planet that are much like the tropical cyclones that sweep through the earth's atmosphere.

The spots make up part of the complex Jovian atmosphere which consists primarily of hydrogen and helium and has been investigated to a depth of almost 100 miles by various spacecraft since 1973. The visible surface of Jupiter is divided in a number of bands parallel to the equator. The light colored "zones" and relatively dark "belts" alternate both northwards and southwards from the wide equatorial zone and are bounded by high speed winds called jets that reach a speed of more than 220 miles per hour. The difference in the appearance between the colorful zones and belts is caused by the diversity of the temperatures, concentrations and thus densities of Ammonia and other chemicals that make up Jovian bands which may include complicated compounds of sulfur, phosphorus and carbon.

The jets themselves surge westward between the bands as they switch from zones to belts (moving away from the equator), whereas eastward jets mark the change from belts to zones. The combination of wind shear and turbulence creates the great rotating storm systems.

With an area large enough to contain more than two planets the diameter of the earth, the Great Red Spot rises about 5 miles above the surrounding clouds. At this height the atmosphere is cool enough so that phosphorus in the storm may condense, possibly creating the red color. The Great Red Spot's discovery is usually attributed to Italian born astronomer Cassini, or Englishman Robert Hooke in the 17th century.

There are many smaller but similar storm systems in the turbulent atmosphere of Jupiter. Most are white and brown ovals, with the smallest features visible at the equator measuring about 600 kilometers across. While some of these storms and even areas of the various belts are temporary, the Great Red Spot is considered a stable structure although it is not known how such systems can persist for so long. The Spot rotates in a counterclockwise direction once every 6 - 7 earth days.

In the year 2000, a storm formed in the southern hemisphere of Jupiter similar in appearance to the Great Red Spot, but smaller. It was created when several smaller, white storms merged to form a single unit. The new feature was named Oval BA, and has also been nicknamed Red Spot Junior. It has since increased in intensity and changed color from white to red.

The colorful and dynamic nature of Jupiter's atmosphere and the associated defining features make the planet a very interesting study and have (like Saturn's rings) made Jupiter an instantly recognizable part of our fascinating Solar System.

Please visit the observatory on Friday, Saturday or Sunday evenings this month 8:00PM – 10:00 PM. Winter hours start on October 15th (7:30PM – 9:30PM).For more information go to www.communityobservatory.com